



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s): Cofino et al.
Docket No.: YOR920000611US1
Serial No.: 09/654,202
Filing Date: September 1, 2000
Group: 3625
Examiner: Robert E. Rhode, Jr.

I hereby certify that this paper is being deposited on this date with the U.S. Postal Service as first class mail addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Signature: *Tim Maurer*

Date: February 25, 2004

Title: System And Method For Visually Analyzing
Clickstream Data With A Parallel Coordinate System

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APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants hereby appeal the final rejection of claims 1-20 of the above-identified application.

REAL PARTY IN INTEREST

The present application is assigned to International Business Machines Corporation, as evidenced by an assignment recorded November 13, 2000, in the U.S. Patent and Trademark Office at Reel 011265, Frame 0732. The assignee, International Business Machines Corporation, is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals and interferences.

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STATUS OF CLAIMS

Claims 1-20 stand finally rejected under 35 U.S.C. §103(a). No claims have been allowed.

STATUS OF AMENDMENTS

An amendment is submitted contemporaneously with this Appeal Brief. The amendment amends claim 17 so that claim 17 depends from claim 16 and not from claim 15. The claims in the Appendix below show that claim 17 depends from claim 16.

SUMMARY OF INVENTION

The present invention provides techniques for visually analyzing clickstream data with a parallel coordinate system. See Title of specification. All references in this section are to the specification of the present invention.

The present invention discloses a computer system and method that provides one or more visualizations to users of a network application. The computer executes a sessionization process that receives Web server logs from online stores, and that generates one session table for each session found from requests recorded in Web server logs. In a preferred embodiment, a session table is a list of requests sorted by session identification and timestamp. See page 4, lines 13-17 and FIGS. 1 and 2. Exemplary web server log data is shown in FIG. 4, and exemplary session tables are shown in FIG. 5.

A shopping step finder process then receives one or more session tables and generates one micro-conversion table for each given session table, each micro-conversion table having one or more shopping steps. See page 4, lines 17-19. Exemplary micro-conversion tables having shopping steps are shown in FIG. 6. A shopping step finder process is shown in FIG. 6A. Finally, a visualization process receives the micro-conversion tables and generates micro-conversion visualizations of shopping steps from micro-conversion tables. In a preferred embodiment, the micro-conversion visualizations are displayed in parallel coordinates. See page 4, lines 18-22. FIG. 8 shows an exemplary visualizations of a number of shopping steps, and these visualizations are described at page 17, line 8 to page 18, line 13. As shown in FIG. 8, a number of

sessions 808-814 and their progressions in a single online store are shown. The visualization process can also create visualizations when sessions visit multiple online stores, as shown in FIG. 12 and described at page 19, line 19 to page 20, line 2.

ISSUES PRESENTED FOR REVIEW

(1) Whether claims 1-4, 8-11, 13-17, and 19-20 are patentable under 35 U.S.C. §103(a) over Papierniak et al. (United States Patent Number 6,175,838, hereinafter “Papierniak”) in view of Yaginuma et al. (United States Patent Number 6,477,538, hereinafter “Yaginuma”); and

(2) Whether claims 5-7, 12, and 18 are unpatentable under 35 U.S.C. §103(a) over Papierniak in view of Yaginuma and in further view of Hunt et al. (United States Patent Number 6,223,215, hereinafter, “Hunt”).

GROUPING OF CLAIMS

With regard to Issue (1), claims 1-4, 8, 9, 13, 15-17, 19, and 20 stand or fall together, claim 10 stands or falls alone, claim 11 stands or falls alone, and claim 14 stands or falls alone.

With regard to Issue (2), claims 5-7 stand or fall together, claim 12 stands or falls alone, and claim 18 stands or falls alone.

ARGUMENT

Issue (1)

With regard to Issue (1), the Examiner rejected claims 1-4, 8-11, 13-17, and 19-20 as being unpatentable under 35 U.S.C. §103(a) over Papierniak in view of Yaginuma.

With regard to the independent claims 1, 19, and 20, which stand or fall together, the Examiner asserted the following at the paragraph spanning pages 3 and 4 of the final rejection, dated August 26, 2003 (emphasis added):

However and as presented, it was clearly positioned in the [previous] rejection that the combination of Papierniak and Yaginuma do disclose and teach “a system and method for providing one or more

visualizations to one or more users". Moreover, the reference sections as indicated and the reference sections in Papierniak (see at least Abstract) while not specifically citing "shopping steps" -- *these shopping steps are implicit* (see at least Abstract and Col 4, lines 45-50). As a result, Papierniak does establish the fact that the "shopping steps" are captured and stored in web server logs (i.e. database), which in combination with Yaginuma (a method and system to display the data visually/visualization in a "micro-conversion table") provides the prima facie case of obviousness and therefore does teach a "shopping step finder process that receive one or more tables, and generates one or more micro-conversion table for each given session table.

Applicants respectfully submit the following: (A) neither Yaginuma nor Papierniak teach or suggest all limitations of independent claims 1, 19, and 20; and (B) the Examiner has not established a *prima facie* case of obviousness.

As to element (A), Applicants in, for example, FIG. 6 show microconversion tables 601, 602, and 603, having exemplary shopping steps entitled "product impressions," "click-throughs," "basket placement," and "purchase." Neither Yaginuma nor Papierniak teach any of these shopping steps or suggest anything that implies or could be construed to be these shopping steps. For instance, Yaginuma is simply an apparatus for displaying the result of a data mining process as multi-dimensional data (see Abstract of Yaginuma). There is no teaching or suggestion that Yaginuma is used for tabulating or visualizing "shopping steps." Similarly, Papierniak is simply an apparatus that correlates Web page files (HTML, SHTML, DHTML, and CGI files) with other types of files (such as GIF, JPEG, and AVI files). See Abstract of Papierniak. There is no teaching or suggestion in Papierniak of generating tables having "shopping steps" or visualizations of "shopping steps," as claimed in independent claims 1, 19 and 20.

Consequently, if neither Yaginuma nor Papierniak disclose "shopping steps," then the combination of the two cannot disclose this limitation. Because neither Yaginuma nor Papierniak disclose this limitation, independent claims 1, 19, and 20 are patentable over the combination of Yaginuma and Papierniak.

As to element (B), the Examiner's argument appears to be the following: Papierniak stores information from Web sites and the "shopping steps" of the present invention are "implicit" in the information stored by Papierniak; the apparatus of

Yaginuma can then be used to search through the information and display a microconversion table having one or more shopping steps and a visualization of shopping steps from the microconversion tables, as claimed in independent claims 1, 19, and 20. The Examiner's argument therefore appears to be that the combination of Yaginuma and Papierniak can be made to perform the limitations of independent claims 1, 19, and 20. However, this argument does not meet the standard for a *prima facie* case of obviousness.

MPEP §2143, in the Eight Edition (Aug. 2001), states the following about establishing a *prima facie* case of obviousness (emphasis in original):

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

As described above, Applicants respectfully submit that there is no teaching or suggestion in the cited references of shopping steps as recited in independent claims 1, 19, and 20. The Examiner admits that shopping steps are not disclosed in either piece of prior art.

As to the suggestion or motivation to modify the references for the limitations of the present invention, the sole suggestion to modify the references comes from the Examiner. As cited above, in the paragraph spanning pages 3 and 4 of the final Office Action, the Examiner has asserted that shopping steps are "implicit" in Papierniak. Furthermore, on page 5 of the final Office Action dated August 26, 2003, the Examiner states "Yaginuma teaches a data display, which . . . is defined by user requirements of ease of understanding"; and "the different fields - a consistent portion of the output display format as taught by Yaginuma . . . are defined by the user." The Examiner appears to be arguing that if a user were to define the fields in Yaginuma as being "shopping steps," then the combination of Yaginuma and Papierniak could be used to create a system having the limitations of independent claims 1, 19, and 20, because Papierniak has implicit information about shopping steps and Yaginuma might be used to create a display of the shopping steps.

But Applicants respectfully submit that there is no suggestion or motivation - other than the suggestion or motivation given by the Examiner - in either cited reference to combine the references in the way the Examiner is arguing should be done. As described above, neither reference teaches or implies that shopping steps taken in an online store should be tabulated or visualized, as is claimed in independent claims 1, 19, and 20 of the present invention.

Consequently, Applicants respectfully submit that a *prima facie* case of obviousness has not been established. Therefore, independent claims 1, 19, and 20 are patentable over Yaginuma and Papierniak, alone or in combination.

The Examiner also cited Hunt against dependent claims 5-7, 12, and 18. Hunt states the following (col. 6, lines 3-9 of Hunt):

At stage 404, every shopping-cart-related activity [of a user] is tracked in the session database and associated with the session ID. In particular, the session database records include the following: the session ID, the time stamp, the page viewed or nature of interaction, and (for shopping-cart-related activities) the online store products or services added or modified.

Hunt also states, at col. 2, lines 17-20, the following: “The user’s actions, such as page views, product detail views, and additions and deletions of items in a virtual shopping cart, can also be stored in the session database associated with the session ID.”

Nonetheless, Applicants respectfully submit that there is no indication in the text of Hunt of “shopping steps” or of a “shopping step finder process” as these terms are used in the present specification and independent claims. For instance, FIGS. 6 and 8 of the present specification show the shopping steps of “product impressions,” “click-throughs,” “basket placement,” and “purchase.” The text of Hunt implies that shopping-cart-related activity of a user is tracked, but there is no teaching or implication that micro-conversion tables having shopping steps are extracted from the session tracking data. In the independent claims, a shopping step finder process is claimed that generates a micro-conversion table having the shopping steps. FIG. 6A shows an exemplary flow chart of a shopping step finder process, and the flow chart is described at page 16, lines 1-19 of the specification. For instance, the inputs to the shopping set finder process are a set of requests in a session, denoted as {R}, and a set of shopping steps, denoted as {S}. See page 16, lines 2-3 of the specification. Exemplary session tables having requests in a

session are shown in FIG. 5 of the specification. From this input, the shopping step finder process outputs another set $\{C\}$, whose elements C_i represent micro-conversions comprising one or more requests tagged as a particular step, S_i , of $\{S\}$. See page 16, lines 15-17 of the specification.

Thus, FIGS. 5 and 6A and the independent claims illustrate that there are techniques used to extract shopping steps and micro-conversion tables from session information, and there is no teaching or implication in Hunt that such techniques are used.

Moreover, even if Hunt, for sake of argument, teaches or implies a shopping step finder process and shopping steps, there is no suggestion or motivation to combine Hunt with Yaginuma or Papierniak. For example, Hunt implies that the data being examined is from source to sale. See col. 2, lines 7 and 8, where Hunt states, “[a]ccordingly, the present invention provides interactive network session tracking from inbound source to net sale.” Therefore, one skilled in the art would not be motivated to visualize shopping steps using a combination of Hunt and Papierniak, as there is no reason to visualize source to sale information. Furthermore, there is no teaching in Hunt of how analysis of the session tracking data is performed. See, for instance, Abstract of Hunt and col. 1, lines 57-60 of Hunt. Thus, there is no suggestion in Hunt that micro-conversion visualizations of shopping steps, as claimed in the independent claims of the present invention, should be generated. Consequently, one skilled in the art would not be motivated to combine Hunt and Yaginuma.

Therefore, Applicants respectfully submit that independent claims 1, 19, and 20 are patentable over Hunt, Yaginuma, and Papierniak, alone or in any combination.

Because independent claim 1 is patentable, dependent claims 2-4, 8, 9, 13, 15, and 16, which stand or fall together with independent claim 1 and include all limitations thereof, are also patentable for at least the reasons described above.

Regarding dependent claims 10, 11, and 14, these claims include all limitations of independent claim 1, are also patentable for at least the reasons described above. Additional arguments are also presented below as to why dependent claims 10, 11, and 14 provide patentable limitations beyond the limitations of independent claim 1.

Regarding claim 10, which stands or fall alone, this claim contains the limitation of “where the extension components include . . . one or more dropouts of polygonal lines.” As shown in FIGS. 8, 9, and 12 of Applicants’ specification, the polygonal lines might drop out before traveling through each parallel axis. For instance, polygonal line 808 never reaches parallel axis 805 and therefore drops out. See page 18, lines 5-8 of the specification, where it states, “[t]his figure (800) shows that the number of lines connecting two adjacent parallel axes decreases, as polygonal lines go from left to right up to the purchase line (805). Dropouts of polygonal lines visualize where the store loses its customers.” By contrast, in Yaginuma, each “polygonal line” reaches each and every parallel axis. See FIGS. 6, 7, 25, 29, 32-35, 37, 40A, 40B, 42, 45-47, 49, and 51 of Yaginuma. Neither Papierniak nor Hunt discloses “polygonal lines.” Consequently, Applicants respectfully submit that dependent claim 10 is patentable over Yaginuma, Papierniak, or Hunt, alone or in combination.

Regarding claim 11, which stands or falls alone, claim 11 contains the additional limitation of “where the parallel axes of sequential events is an assignment of a series of sequential events to parallel lines in a parallel coordinate system.” Applicants can find no teaching or implication in Yaginuma, Papierniak, or Hunt of an assignment of sequential events to parallel lines in a parallel coordinate system. In particular, Applicants have examined each of the FIGS. 6, 7, 25, 29, 32-35, 37, 40A, 40B, 42, 45-47, 49, and 51 of Yaginuma and none of these figures contains an assignment of sequential events to parallel lines in a parallel coordinate system. Therefore, claim 11 is patentable over Yaginuma, Papierniak, or Hunt, alone or in combination.

Regarding claim 14, which stands or falls alone, this claim contains the limitation of “where the dropout of a polygonal line is disappearance of a polygonal line before the line reaches the last parallel axis in a parallel coordinate system with the parallel axes of sequential events.” The arguments given above in reference to claim 10 are equally valid in regards to claim 14, and Applicants respectfully submit that dependent claim 14 is patentable over Yaginuma or Papierniak, alone or in combination.

Issue (2)

With regard to Issue (2), the Examiner rejected claims 5-7, 12, and 18 as being unpatentable under 35 U.S.C. §103(a) over Papierniak in view of Yaginuma and in further view of Hunt. Above, Applicants respectfully submitted that independent claim 1 is patentable over Papierniak, Yaginuma, and Hunt, alone or in combination. Because dependent claims 5-7, 12, and 18 depend from independent claim 1 and include all limitations thereof, these dependent claims are also patentable. Dependent claims 5-7 stand or fall with independent claim 1. However, additional arguments are also presented below as to why dependent claims 12 and 18 provide patentable limitations beyond the limitations of independent claim 1.

Regarding claim 12, which stands or falls alone, this claim contains the limitation of “where the sequential events include one or more steps of shopping in one or more stores, and one or more product or service development steps.” As described above in reference to claim 11, Applicants can find no teaching or implication in Yaginuma, Papierniak, or Hunt of an assignment of sequential events to parallel lines in a parallel coordinate system. In particular, Applicants have examined each of the FIGS. 6, 7, 25, 29, 32-35, 37, 40A, 40B, 42, 45-47, 49, and 51 of Yaginuma and none of these figures contains an assignment of sequential events to parallel lines in a parallel coordinate system. Furthermore, there is no indication in Hunt, Papierniak, or Yaginuma of the sequential events being one or more shopping steps or one or more product or service development steps. Therefore, claim 12 is patentable over Yaginuma, Papierniak, or Hunt, alone or in combination.

Regarding claim 18, which stands or falls alone, this claim includes the limitation of “where the hyperlink association is the association of one or more hyperlinks with the polygonal line representing a session, clicking on the polygonal line opens a Web page delivering detail information of the session.” There is no teaching or implication in Hunt, Papierniak, or Yaginuma that clicking on a polygonal line opens a Web page delivering detail information of a session. Yaginuma does state that a user can select a “class” (see FIGS. 37 and 38 of Yaginuma and associated text at col. 17, line 51 to col. 18, line 64 of Yaginuma), but the class selected has nothing to do with a “session” as defined by the present specification.

Applicants respectfully submit that all claims are patentable over the cited art, alone or in combination.

Respectfully submitted,

Dated: February 25, 2004



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APPENDIX

1. A computer system for providing one or more visualizations to one or more users, the system comprising:

one or more central processing units, one or more memories, and one or more network interfaces to one or more networks;

a sessionization process that receives one or more Web server logs from one or more online stores, and generates one session table for each session found from requests recorded in Web server logs;

a shopping step finder process that receives one or more session tables, and generates one micro-conversion table for each given session table, each micro-conversion table comprising one or more shopping steps; and

a visualization process that receives one or more micro-conversion tables, and generates one or more micro-conversion visualizations of shopping steps from one or more of the micro-conversion tables.

2. A system, as in claim 1, where the Web server log includes one or more Web page request records.

3. A system, as in claim 2, where the Web page request record comprises a timestamp that is the system-generated time when the request is made, a user identification that is a unique number identifying the user who made the request, a session identification that is a unique number identifying the session which made the request, a referrer that is the Web page the session sees immediately before making this request, a current page that is the Web page requested, and a group of hyperlinks that is contained in the current page.

4. A system, as in claim 1, where the session table includes one or more Web page request records with all the session identification values in a session table being the same.

5. A system, as in claim 1, where each micro-conversion table further comprises product entries for each shopping step.

6. A system, as in claim 5, where the shopping steps include a product impression that is the view of hyperlink to a Web page presenting a product and/or a service, a clickthrough that is the click on the hyperlink and view of the Web page of the product and/or service, a basket placement that is the placement of the item in the shopping basket, and a purchase that is the purchase of the item and the completion of the transaction.

7. A system, as in claim 5, where the product or service entry comprises a product or service identification that is a unique number identifying the product or service, and a timestamp when the corresponding shopping activity happens.

8. A system, as in claim 1, where the micro-conversion visualization comprises a traditional parallel coordinate system and one or more extension components.

9. A system, as in claim 8, where the traditional parallel coordinate system is a parallel coordinate system comprising a series of parallel lines that are placed equidistantly, each parallel line being assigned a specific dependent variable and dependent variable values being plotted along the respective axis, and an independent variable that is represented by polygonal lines connecting the corresponding dependent variable values and illustrating a relationship between an independent variable and the dependent variables appearing on each axis.

10. A system, as in claim 8, where the extension components include one or more parallel axes of sequential events, one or more dependent variable values of timestamps, one or more dropouts of polygonal lines, one or more filters, one or more categorizers,, and one or more hyperlink association.

11. A system, as in claim 10, where the parallel axes of sequential events is an assignment of a series of sequential events to parallel lines in a parallel coordinate system.

12. A system, as in claim 11, where the sequential events include one or more steps of shopping in one or more stores, and one or more product or service development steps.

13. A system, as in claims 10, where the dependent variable values of timestamps is an assignment of timestamp values as data points to a series of sequential events that are assigned to the equal number of parallel axes in a parallel coordinate system.

14. A system, as in claims 10, where the dropout of a polygonal line is disappearance of a polygonal line before the line reaches the last parallel axis in a parallel coordinate system with the parallel axes of sequential events.

15. A system, as in claim 10, where the filter is a means to select and/or de-select one or more groups of polygonal lines viewed in a parallel coordinate system.

16. A system, as in claim 10, where the categorizer is a parallel axis in a parallel coordinate system whose purpose is to categorize polygonal lines in the system.

17. A system, as in claim 16, where the categorizer includes one or more of the following: the referrer Web sites of sessions, the Internet Service Providers of sessions, the lengths of sessions, the methods used to find product or service information by sessions, the geographic regions where sessions come from, the ages, sex, education levels, and income levels of the owners of sessions, the sales history of the owners of sessions, the Web page patterns accessed by sessions or by the owners of sessions, either or not ordered by session, or by time.

18. A system, as in claim 10, where the hyperlink association is the association of one or more hyperlinks with the polygonal line representing a session, clicking on the polygonal line opens a Web page delivering detail information of the session.

19. A method for visually analyzing clickstream data comprising the steps of:
receiving one or more Web server logs from one or more online stores'

Web server systems;

generating one or more session tables from the one or more Web server logs;

generating one or more micro-conversion tables from the generated one or more session tables, each micro-conversion table comprising one or more shopping steps;

generating one or more micro-conversion visualizations of shopping steps from one or more of the micro-conversion tables; and

interactively generating one or more variations of the generated micro-conversion visualizations upon interactive requests from one or more users.

20. A computer system for visually analyzing clickstream data comprising:

means for receiving one or more Web server logs from one or more online stores' Web server systems;

means for generating one or more session tables from the one or more Web server logs;

means for generating one or more micro-conversion tables from the one or more generated session tables, each micro-conversion table comprising one or more shopping steps;

means for generating one or more micro-conversion visualizations of shopping steps from one or more of the generated micro-conversion tables; and

means for interactively generating one or more variations of the generated micro-conversion visualizations upon interactive requests from one or more users.